The method of burning the smoke at the mint at Paris above described, seems considerably easier of execution than any before published, and on that account is well worth notice.

*On the use of Stahl's alkalized oxide of Iron, in Calico printing, by J. M. Hausman.**

M. Hausman makes great use of this dye in the preparation of printed calicoes; he endeavours to overload it with oxide of iron. In order to guard against precipitation, and to easily suspend the solution, he ties up the metal that is to be dissolved into a bundle, that he may take it out at pleasure whe the nitrous acid is ready to flow over. For by employing this precaution when the bundle is taken out (after the effervescence, which produces a great heat, has sufficiently subsided) while an excess of acid remains, which is certainly necessary, a pigment will be obtained without any deposit.

If a sufficient quantity of fluid, consisting of three parts of calcined carbonate of potash of the shops, and of two parts of water, be poured into the nitrous solution of iron, there will, on stirring the mass (by which means it effervesces a little) be formed a magma; to which as much liquid carbonate of potash must be added as is necessary for its complete solution. This solution of iron gives, with a fifth or sixth part of gum water (prepared from equal parts of gum Arabic and water, and then thickened) ochery yellow colours which can be easily purified. The addition of a twelfth part of a decoction of yellow berries, with a twenty fourth part of a decoction of logwood, gives the tint known by the name of American colour: and a twelfth part of a décoction of logwood, without yellow berries gives a chocolate colour.

If this dye be diluted with a sufficient quantity of water, all the oxide falls to the bottom. When edulcorated filtered, and brought to a white heat in a crucible, this oxide polishes steel as completely as the English colcothar.

Linen or worsted yarn impregnated with this dye, and then immersed in a dye liquor prepared with caustic alkali, which precipitates the oxide of iron, acquires by this process a much darker yellow, than when it is left at rest for twenty four hours, and then dried, and washed.

Every drop of a solution of caustic alkali applied to this dye, precipitates from it a part of the oxide as it overcomes the carbonic acid. By these means it is completely decomposed; and this oxide, when washed, and exposed to heat for a sufficient time, gives a very fine polish too.

This dye is nothing else but a solution of hyperoxigenated carbonate of iron, by an alkaline carbonate which serves it as a vehicle; only care must be taken not to add too much when dark colours are required.

All solutions of iron sufficiently oxigenated, treated with an alkaline carbonate, in the same manner as the nitrous solution of iron, are capable of producing a similar dye.

A nitrous solution of copper, prepared from nine pounds of green oxide of copper, nine pounds of water, and three pounds of cream of tartar, with a solution of carbonate of potash, and treated as the nitrous solution of iron produces similar effects. When mixed with gum, and imprinted on woollen or cotton stuffs, it deposits the oxide of copper of a beautiful green tint. A gummed amoniacal solution of copper may be employed in its stead; for when the cloth is dried the ammonia is disengaged from it, and the green oxide remains united with it in consequence of its cohesion.

If linen or woollen yarn be soaked in nitrous or any other hyperoxigenated solution of iron, diluted with more or less water, and then be exposed for some minutes to a caustic alkaline ley, a beautiful nankeen colour will be produced. Instead of the nitrous solution, one more or less diluted of sulphuric acid may be employed. Many articles when taken from the caustic ley are dirty, but when they have attracted the oxigen of the atmosphere, they acquire the proper brightness. These colours pass to violet and black by maddering. They will acquire a deep black colour, as

* Inserted by particular request, from Phil. Mag. v.17 p.323.

well as different shades of grey, when treated with gallnuts, sumack, or logwood. Several blue shades may also be obtained from them by employing a ley of alkaline prussiate, or calcareous earth, oxigenated by any acid. The various shades of deep grey are produced by stronger or weaker infusions of gallnuts, which must be suffered to dry on the yarn impregnated with them; after which the yarn is immersed in sulphuric, nitric, muriatic, or acetic acid, diluted with water.

A nitrous solution of iron, when freed from its acid by evaporation, and brought to a white heat in a crucible, gives an oxide of iron, which is an excellent polisher of steel; a solution of iron in sulphuric acid has the same effect but in this case the oxide must be longer exposed to heat. A muriatic solution of iron may be employed for the same purpose; but the acid when evaporated by a strong heat, carries with it a large portion of the oxide. All methods in general by which iron can be sufficiently oxigenated, will produce an oxide fit for polishing steel.

M. Hausman having tried several years ago to oxigenate oxide of iron as much as possible, in order to convert it into acid, mixed together, in the course of several unsuccessful experiments, a pound of a nitrous solution of iron and half a pound of concentrated sulphuric acid. When the mixture was evaporated to dryness in a porcelain dish, there remained a white residuum, entirely insipid. On examining it several weeks after, he found it had attracted moisture and had assumed an astringent taste. A few weeks after this, when a certain portion of it had been disolved in the moisture which this residuum had attracted from the atmosphere, he poured off the liquor, which still had an astringent taste and preserved it in a glass. After some time he found in it very beautiful transparent crystals, which resembled alum. Having immersed it in an alkaline solution of prussic acid, its surface became covered with the most beautiful Prussian blue, which suffered itself to be removed by washing, without its colour being changed. This blue was reproduced as long as any of the crystals remained. In the air these crystals became yellowish, in consequence no doubt of the solar rays having disengaged from them a portion of oxigen, for Mr. Hausman found them afterwards on examination to be nothing else but the hyperoxigenated sulphate of iron. This salt is insufferably astringent. When diluted with a great deal of water a precipitate is produced, and speedier when the mixture is exposed to heat. The filtered precipitate had a most beautiful yellow colour. A high temperature however deprived it of its colour, as it by this lost its excess of oxigen.

On repeating this experiment Mr. Hausman always obtained the same result, and when he exposed the white insipid residuum, in a glass retort combined with a Wolf's apparatus, to such a degree of heat as brought it to a state of ignition, the acid was disengaged from it in the form of sulphureous and sulphuric acid, accompanied with a mixture of oxigen gas. The oxide of iron, obtained in the retort after the experiment, was of a brownish colour, and fit for polishing.

If the quantity of sulphuric acid be lessened there will be obtained, in like manner, a white pulverulent residuum; which, notwithstanding its insipidity dissolves in an equal portion of warm water; and after cooling, and being left some time at rest, produces crystals.

The hyperoxigenated oxide of iron obtained from Stahl's tincture of iron, or any other acid solution of the metal, when precipitated and again dissolved in sulphuric acid, with some excess of the latter, gives also beautiful crystals of hyperoxinated sulphate of iron.

The common sulphate of iron, which is oxigenated by nitrous acid, or by the absorption of nitrous gas, does not crystallise; and when the evaporation is not continued to dryness, acquires the consistance of syrup or honey. But if a fifth or sixth of concentrated sulphuric acid be added, a confused crystallisation is immediately produced which forms a compact mass. This proves that hyperoxigenated crystalised sulphrate

of iron requires a greater quantity of acid than the common sulphate.

The muriatic acid becomes very strongly oxigenated when dissolved in hyperoxigenated sulphate of iron, which thereby acquires a yellowish colour.

The hyperoxigenation of iron increases its affinity for acids in such a manner that calico printers make no use of an acetic solution of hyperoxigenated oxide of iron, as it does not readily give up its acid by drying.

Account of the method of breeding fish used by Mr. Jacobi of Lippe county in Germany.

Hanover Mag. No. 3, and Phil. Mag. No. 34 p. 268.

Mr. Jacobi's apparatus for breeding fish is a large water trough, about twelve feet long which is fixed in a place where there is a water fall from a spring, which was conveyed through a small gutter into the trough so as to cause a great water fall. Upon this trough is placed a cover like the lid of a box, with several holes in it of six inches square, which are filled up with a wire grating, not only to admit air, but so close as to prevent the water mice from passing through, which follow close to the fish at spawning time and are very fond of the spawn. At the lower end of this trough, about five inches above the bottom, is a hole filled up with the same kind of wire grating and of the same size as that at the top, through which the water runs into a fish pond or canal, by which means the water in the trough is always five inches deep. In the bottom of the trough a kind of coarse gravel is laid, about two inches thick, such as is commonly met with in gravelly ponds. December is the spawning time for Trout or Salmon, at that season if a female fish is taken and her belly gently pressed and rubbed, she will part very freely with her spawn, without any prejudice The spawn is to be received in a bason of clear water; and the milt or soft roe of a male fish, procured in a similar manner, is to be stirred up well with it in the bason, which is to be carried to the trough before the water is let in; and the prepared spawn is then to be sprinkled very thin upon the coarse gravel; the water from the spring is then to be let into the trough, and nothing more is necessary to be observed at that time, but that the water may have a constant current through the wires, and that these wires be kept clear from filth. on the third or fourth day after, the trough should be opened, to inspect whether the spawn is not covered with slime, or nastiness; in which case the water is to be moved horizontally with a flat hand, tolerably briskly; which motion will clear the spawn from the slime, and at the same time turn the eggs. It will have the same effect if the roe is cut out from a female fish and the milt from a male fish, and mixed together in water, as when they are procured in the manner mentioned.

In this manner Mr. Jacobi annually breeds vast quantities of trouts, he has observed that as soon as the fish is out of the egg, it has on its belly a bladder, from which it receives its first nourishment, and which becomes every day less until it vanishes at last; so long as the bladder appears he suffers the young ones to remain in the trough, afterwards he lets them out in the pond to seek food for themselves. He has proceeded in the same manner with Salmon, and with the same good success. He has observed that the young fish can be distinctly seen enclosed in the pregnant egg of a trout in its last stage.

The time of the spawning of fishes differs somewhat every year; partly owing to the influence of the weather, or to the beds in which they spawn; some require hard and stoney, others soft and slimy, and others bushy bottoms, and some herbs and grass. Trouts will not spawn but on a stoney and gravelly bottom, although some creep under the roots of trees, and in hollows near the shore where they are sometimes so entangled that they may be caught by the hand; they avoid spawning there, but will return again to find a place where the water has a fall and runs briskly, and where there is a gravelly bottom. After they have chosen a place they will beat violently into the gravel, or coarse sand, till they make a deep hole, and so deep that it is frequently